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research highlights

EARLY UNIVERSE

A very dusty affair

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The epoch of reionization (roughly between redshifts of 6 and 10) is the current frontier of observations investigating how the first galaxies formed and evolved and how they subsequently ionized and enriched the until-then neutral and pristine intergalactic medium. Finding out when dust, a product of supernovae explosions, was first created is part of that endeavour.

Because of its magnifying power, gravitational lensing has been critical in enabling astronomers to study galaxies during the reionization epoch. Nicolas Laporte and collaborators turned the piercing gaze of the fully operational ALMA (Atacama Large Millimeter Array) to look for potential dust emission from a typical star-forming galaxy at a redshift of $z \sim 8.4$. Surprisingly, the clear detection of the far-away galaxy in continuum emission at around a rest-frame wavelength of 100 μm indicates that the galaxy contains a whopping six million solar masses of dust.

By modelling its spectral energy distribution, Laporte *et al.* found that the galaxy had been forming stars at a rate of twenty solar masses per year. Back-of-the-envelope calculations show that, if this star formation rate had been sustained for the past 200 million years, the resulting supernovae could have produced the dust mass implied by the ALMA detection. ALMA is clearly a powerful tool that is already pushing our knowledge towards the cosmic dawn and the onset of chemical enrichment. ❐

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